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PROCEEDINGS  
—OF THE—  
NATIONAL MICROSCOPICAL CONGRESS,

CONVENED AT INDIANAPOLIS, IND.,

*AUGUST 14th, 1878.*

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PRELIMINARY STATEMENT.

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During the year 1877, the microscopical section of the Indianapolis Lyceum of Natural History addressed a circular letter to the various microscopical societies throughout the United States, requesting expressions of their views touching the desirableness of a National Convention of the microscopists of the country, for the purpose of taking the necessary steps to form a National Association for the promotion of the progress of microscopical science, and for the benefit and advantage of all concerned therein. Favorable replies having been generally received, a call was issued by the Indianapolis Society, in May, 1878, inviting all microscopists throughout the United States to meet at Indianapolis, August 14th, 1878.

## THE CONVENTION.

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### FIRST DAY—August 14th.

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#### MORNING SESSION.

The National Microscopical Congress, met pursuant to call, at the Court House, at Indianapolis, Indiana, at 10 o'clock, A. M., August 14th, 1878.

Present during the Convention, were the following delegates :

Atkinson, W. H., M. D., D. D. S., New York City.  
Atwood, H. F., Chicago, Ill.  
Barringer, Wm., Bellefontaine, Ohio.  
Bausch, Edward, Rochester, N. Y.  
Beach, Wm. F., Jeffersonville, Ind.  
Belfield, Wm. T., M. D., Chicago, Ill.  
Blackham, Geo. E., M. D., Dunkirk, N. Y.  
Brandenburg, Chas. A., Indianapolis, Ind.  
Bulloch, Walter H., Chicago, Ill.  
Burrill, T. J., Urbana, Ill.  
Butterfield, W. W., M. D., Indianapolis, Ind.  
Clayton, J. R., Shelbyville, Ind.  
Dennis, S. W., D. D. S., San Francisco, Cal.  
Everts, Orpheus, M. D., Indianapolis, Ind.  
Fell, Geo. E., C. E., Buffalo, N. Y.  
Fisher, J. H., Rochester, N. Y.  
Fuller, Chas. G., Jamestown, N. Y.  
Gardner, J., M. D., Bedford, Ind.  
Griffith, E. H., Fairport, N. Y.  
Hawxhurst, D. C., Battle Creek, Mich.  
Hervey, Rev. A. B., Troy, N. Y.  
Hill, E. J., Englewood, Ill.  
Hitchcock, R., F. R. M. S., New York City.

Hoskins, Wm., Chicago, Ill.  
 Howe, Lucien, M. D., Buffalo, N. Y.  
 Hum, Mandeville T., Louisville, Ky.  
 Hunt, P. G. C., D. D. S., Indianapolis, Ind.  
 Hussy, John, Lafayette, Ind.  
 Hyatt, J. D., New York City.  
 Jameson, Henry, M. D., Indianapolis, Ind.  
 Jones, Geo. Wheeler, M. D., Danville, Ill.  
 Kellogg, J. H., Battle Creek, Mich.  
 Litton, A., St. Louis, Mo.  
 Marvin, J. B., M. D., Louisville, Ky.  
 Piper, Richard U., M. D., Chicago, Ill.  
 Ranny, Mark, Mt. Pleasant, Iowa.  
 Redding, Thos. B., New Castle, Ind.  
 Roberts, J. B., Indianapolis, Ind.  
 Sharp, Ebenezer, Indianapolis, Ind.  
 Sidle, John W., Philadelphia, Pa.  
 Slocum, C. E., Shelbyville, Ind.  
 Smith, J. Edwards, M. D., Cleveland, Ohio.  
 Stidham, Rev. I. F., Columbus, Ohio.  
 Taft, J., D. D. S., Cincinnati, Ohio.  
 Wall, John L., New York City.  
 Walmsley, Wm. H., Philadelphia, Pa.  
 Ward, R. H., M. D., Troy, N. Y.  
 Wells, Merritt, D. D. S., Indianapolis, Ind.  
 Vorce, C. M., Cleveland, Ohio.

The convention was called to order by Dr. Henry Jameson, of Indianapolis. Rev. A. B. Hervey, of Troy, N. Y., was chosen temporary chairman, and Mr. H. F. Atwood, of Chicago, temporary secretary.

Mr. Hervey, on taking the chair, briefly addressed the convention, and prayer was offered by Rev. J. Bradford Cleaver, of Indianapolis. Hon. John Caven, Mayor of the city of Indianapolis, welcomed the members of the convention to the city. Dr. Everts, on behalf of the Indianapolis society, then delivered the following address of welcome:

#### ADDRESS OF DR. EVERTS.

*Gentlemen*—It affords me unusual gratification, as one “native and to the manner born,” to extend to you, gentlemen, from many States, assembled here to-day in the interest of science and for the diffusion of useful knowledge, a most cordial welcome. It would have been an agreeable and an honorable assignment had my duty limited me to an expression of the private feelings of the few but rare and worthy members of the society to whose call for this convention you have so generously responded. But I have the additional satisfaction of addressing you in the name of the men and women who constitute the solid elements and active forces of our prosperous young city. To those who may or might have helped to fell the primal forest which but half a century since shook its

shaggy locks above the ground whereon this city stands—and there are such in our midst—the assembling of this congress here is an event worthy of commemoration.

That such a congress should meet anywhere, is not a circumstance unworthy of attention, witnessing, as it does, the estimation in which scientific knowledge of whatever character is held by this age and people. That it should meet here, in this new field, wrested from the wild beast and the savage within our own memories, is an additional testimony to the catholicity of science, whose domain is not limited to states or continents, but is wherever matter is and mind can penetrate. Where cities teem or pathless forests grow; where miners delve, or harvest songs are sung; where insects flit, or monsters cleave their way; where nameless islands fleck the unnamed sea; all depths, all heights, all breadths, and all expanse; all things created, and all things to be, these are its empire, and its subjects, all! The history of science is the history of human development in morals and intelligence, the history of a grand march of the civilized races of mankind from the low lands of ignorance and superstition, wherein they were so long held captive, toward that altitude of possible attainment whereto our steps forever tend, the summit of which is hidden, not in clouds or darkness, but in light too pure and brilliant for our unaccustomed eyes; for, whether the moral or intellectual development of the race is a result of scientific labor and attainment, or science itself is a result of human evolution, the fact is still the same; as there is, and ever has been, a definite relation of the one condition to the other. The moral and intellectual manifestations of the race corresponding to the development of science among men at any given time in its history. It has been claimed, nevertheless, and may be still claimed in some quarters, that the moral status of mankind has not been elevated or improved by the influence of science. And there are vestiges, even yet, of hitherto antagonism between science and religion. But these conflicts have now, for the most part, ceased. And, if judged by the testimony of the just, science has not been the sufferer by the tournament. If tried by higher and more rational perceptions, it will be found that religion is purer, brighter, and holier because of the ordeal, having lost nothing but false armor and encrustations, which embarrassed without protecting the vitality within. And let me now predict that a time will come, and is not distant, when Christianity itself, in which are aggregated all of the imperishable elements of religious truth and good, will recognize and confess its obligations to science for having aided and effected a withdrawal of its living elements from the dead and burdensome concretions of Egyptian, Chaldean, Hebrew, Greek, Roman, and Germanic Paganisms, with which its earlier imperial and pontifical propagandists almost inextricably environed them. And science in return will perceive and accept the incontrovertible truths of Christianity as essential to the fullness of its own discovered truth. We are approaching such an epoch. Compare the religion of to-day with the religion of any former century. Does it not occupy a similar relation to its past self that modern science occupies to the intellectual speculations of ancient and mediæval philosophers? Is not the Christianity of to-day, as manifested in its higher and more intelligible expressions, to the Christianity of past ages as the astronomy of Galileo and Newton, Herschel and La Place, is to the astrology of Egypt and Chaldea? as the chemistry of Lavoisier and Davy, is to the alchemy of Geber and Paracelsus? And, except by such persons as may still regard Parson Jasper, of Virginia, as a better exponent of religious truth than Professor Cook, of Boston, it must be conceded by all that this *pari passu* progress of science and morals is significant of something more than a mere coincidence.

But, gentlemen, I beg pardon for the intrusion of these suggestions. It was not for such a purpose that my friends commissioned me to speak to you. Science needs no apologist or defender. The men themselves whom I see before me, its followers and devotees, whose minds and hearts have been opened and enlarged thereby, are a sufficient answer to all cavilers. And so, in behalf of the highest moral perceptions, as well as of the active intelligence of our people, hoping that your deliberations may be as profitable to yourselves as they will be pleasurable to us, I bid you welcome to Indianapolis.

The temporary chairman, Mr. Hervey, responded on behalf of the convention as follows:

The fact that I have been called upon to preside temporarily over this meeting, renders it my duty and pleasure to make brief response to the very hearty welcome that has been given us. We esteem it a proud privilege to be thus received by the mayor in his official capacity, and welcomed by the intelligent and cultivated residents of this noble city. We needed not to be assured in advance that we were welcome, because the community amongst which you live is one that has a reputation that is more than local for its cultivation and intelligence. Indianapolis has on previous occasions been well tested as to her hospitality by the scientific men of America. Those of us who attended the meeting of the American Association for the Advancement of Science which was held in this city seven or eight years ago, have carried the remembrance of the excellence of your hospitality and intelligence and cultivation, throughout all the land. Not a single member has come here at all ignorant or in doubt as to the kind of reception we should have from this community. We are glad to meet you, and to share the hospitality of your homes, and mingle in your social life. We hope during our stay to make acquaintances and associations which shall not be dissolved or lose their joy and sweetness while life shall last. It is an especial pleasure to us to be welcomed by the public officers in this magnificent building, and we hope to have it in our power to make some return for the cordiality with which you greet us by giving you the advantage of whatever knowledge we may have attained as the result of our studies.

The Chair announced that the Convention would next proceed to the work of permanent organization. The following gentlemen were appointed a committee of five to nominate the permanent officers of the Convention: Mr. Vorce, of Cleveland, Dr. Butterfield, of Indianapolis, Mr. Stidham, of Columbus, Prof. Hitchcock, of New York City, and Mr. Atwood, of Chicago.

On motion, the Convention took a recess of fifteen minutes.

#### PERMANENT ORGANIZATION.

On the re assembling of the Convention, the Committee on Permanent Organization, reported the following for the permanent officers of the Convention: President, Dr. R. H. Ward, of Troy, New York; Vice-Presidents, Dr. J. Edwards Smith, of Cleveland, Ohio, and Dr. W. W.

Butterfield, of Indianapolis, Indiana; Secretary, Mr. H. F. Atwood, of Chicago, Illinois; Treasurer, Dr. J. B. Marvin, of Louisville, Kentucky.

The report of the Nominating Committee was unanimously adopted, and the Convention was declared permanently organized and ready to proceed to business.

#### READING OF PAPERS.

The Secretary then read a paper prepared by Professor William A. Rogers, of Harvard University, on "The Limit of Accuracy Attainable in Measurements with the Microscope." Accompanying the paper, Professor Rogers sent for inspection a plate illustrating microscopical rulings by recently improved methods, a half-inch being divided into hundredths of an inch, with an equality of spacing not known to have been attained before.

The Secretary read a paper prepared by C. C. Merriman, of Rochester, New York, on "Some New Methods of Mounting Opaque Objects."

The Convention then adjourned until 2 o'clock P. M.

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#### AFTERNOON SESSION.

The Convention re assembled pursuant to the morning adjournment; the President in the chair. The session was entirely occupied in the examination and inspection of microscopes, accessories and mountings, which were on exhibition in the hall where the sessions were held.

## SECOND DAY.—August 15th.

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### MORNING SESSION.

The Convention re-assembled at 10 o'clock; the President in the chair. Dr. Jameson moved that the matter of a permanent National Organization of Microscopists of the United States, also the selection of the time and place for the holding of the next Convention of the Association, (if it be found desirable to organize such an Association), be referred to the Committee appointed previously on Nominations, for consideration, and report thereon to this Convention. The motion was amended by adding to said Committee one member from each Society represented in this Convention, and was then adopted.

In pursuance of this motion, the Chair appointed the following Committee: Mr. C. M. Vorce, Prof. R. Hitchcock, Dr. W. W. Butterfield, and Mr. H. F. Atwood, of the Nominating Committee; together with Mr. Chas. G. Fuller, of the Jamestown Society, Mr. Geo. E. Fell, of the Buffalo Microscopical Club, Mr. J. D. Hyatt, of the New York Society, Dr. George E. Blackham, of the Dunkirk Society, Rev. A. B. Hervey, of the Microscopical Section of the Troy Scientific Association, Mr. W. H. Bulloch, of the State Society of Illinois, Dr. Henry Jameson, of the Biological Section of the Indianapolis Lyceum of Natural History, Mr. W. F. Beach, of the Louisville Microscopical Society, Mr. J. L. Wall, of the American Postal Micro-Cabinet Club, Dr. S. W. Dennis, of the San Francisco Microscopical Society, Rev. I. F. Stidham, of the Microscopical Section of the Tyndall Association of Columbus, Dr. Lucien Howe, of the Buffalo Society of Natural Science, Dr. Wm. B. Fletcher, of the Indiana State Microscopical Society, and Mr. W. H. Walmsley, of the Philadelphia Academy of Natural Sciences. The President, Dr. Ward, was asked by the Convention to represent the Microscopical Section of the American Association for the Advancement of Science.

### READING OF PAPERS.

Papers were read and discussed as follows: By Mr. W. H. Bulloch, on "The Formulæ of Objectives"; by Mr. C. M. Vorce, on "Mechanical Fingers"; by Dr. Geo. E. Blackham, and by Prof. R. Hitchcock, on "Angular Aperture." After discussion of the above-named papers, Prof. Hitchcock submitted following preamble and resolutions, and moved their adoption:



"Whereas, The subject of angular aperture of objectives has been discussed for many years without great benefit to science, or showing even now a fair prospect of a satisfactory settlement; and

"Whereas, We believe that much of this discussion has sprung from the undefined meaning of the term; and

"Whereas, We, representing in this National Microscopical Congress the various societies and classes of microscopists in the United States, believe that by recommending and adopting a definite meaning for the term, we can advance the interests of true science; and

"Whereas, In the present state of our knowledge of objectives, we see no indication that the capacity of an objective to resolve lined tests depends upon its angular aperture, as distinguished from other optical qualities apart from workmanship; we therefore adopt the following resolutions:

"Resolved, That we accept the following as a definition of angular aperture as applied to the objectives used with the microscope:

"The angular aperture of a microscope objective is the angle at the apex of a triangle, having a base equal to the available diameter of the front lens, and a height equal to the actual focal length (working distance), measured in air for a dry lens, and in the fluid employed for an immersion, the collar being adjusted for the most perfect definition in every case.

"Resolved, That we request all makers to mark their objectives in future to correspond with the definition above adopted.

"Resolved, That this preamble and these resolutions be distributed in circular form among the various societies and makers of objectives as the congress may appoint, with the request that they give their formal approval and communicate whatever action they may take.

"Resolved, That we recognize that the interposition of cover glass, balsam, or any other medium of a different refractive power from the one for which the aperture is given, has more or less effect upon the aperture and image, and we recommend this as a subject for investigation."

Professor Hitchcock then briefly addressed the Convention, in support of his resolutions.

The President before putting the resolutions, relinquished the chair and addressed the Convention in opposition to their adoption.

After some further discussion, Professor Hitchcock withdrew his motion for the adoption of the resolutions.

The Convention adjourned to meet at 2 o'clock P. M.

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#### AFTERNOON SESSION.

The Convention re-assembled, pursuant to adjournment, at 2 o'clock.

#### READING OF PAPERS.

The President, Dr. R. H. Ward, read a paper on "The Microscopical Study of the Ashes of Leaves." Rev. A. B. Hervey then read a paper on "The Classification of Algæ." Adjourned until 10 A. M. following day.

In the evening the delegates visited the Grand Hotel, and examined various instruments, accessory apparatus, specimens, etc., etc.

## THIRD DAY.—August 16th.

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### MORNING SESSION.

The Convention re-assembled pursuant to adjournment, the President in the chair.

### READING OF PAPERS.

Papers were read as follows: By Dr. W. T. Belfield, on the "Migration of Leucocytes;" by Professor R. Hitchcock, on "Microscopic Measurements;" by Mr. C. M. Vorce, on "A Handy Rule for use in Micrometry;" by Mr. J. D. Hyatt, on "The Sting of the Honey Bee."

The Convention adjourned to meet at 10 o'clock the following day.

The afternoon was spent by the delegates in a complimentary excursion over the Indianapolis Belt Railway; visits to the Stock Yards, manufactories, and other places of interest in and near the city.

In the evening a Microscopical Soiree was held between the hours of 8 and 11 o'clock, in the hall occupied by the Convention, the attendance consisting of delegates and invited residents of Indianapolis.

## FOURTH DAY.—August 17th.

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### MORNING SESSION.

The Convention re-assembled pursuant to adjournment, with the President in the chair.

The Committee heretofore appointed to report a plan for permanent organization of a National Association, and to fix a time and place for holding the next meeting, reported as follows :

“ We think it desirable to have a national organization for the promotion of microscopical science, and hereby offer the following as an outline for the constitution of such an organization :

“ Article I. This organization shall be called the American Society of Microscopists.

“ Art. II. The object shall be the encouragement of microscopical research in all branches of science, by meetings, discussions, demonstrations, and the reading and publishing of papers.

“ Art. III. Any person interested in microscopical science is eligible to membership, and may become a member of the society upon recommendation in writing by two members, nomination by the executive board, and election by a majority of the members present at a regular meeting.

“ Art. IV. The officers shall consist of a president, two vice-presidents, a secretary and treasurer, and shall hold their offices one year, or until their successors are elected and qualified.

“ Art. V. The executive board shall consist of the officers of the society, and the past presidents, with three members elected from the society.

“ Art. VI. The place of meeting shall be determined annually by ballot, at the same time and place as the election of officers.

“ Art. VII. The election of officers shall be held on the morning of the last day of each meeting, and those elected shall be installed in the afternoon of the same day. They shall be elected by ballot, without nomination. In case there is no choice on the first ballot, all the candidates except the two candidates having the highest number of votes, shall be dropped, except in case of a tie. A majority of all the votes cast, shall be necessary to a choice.

**"Art. VIII.** The duties of the officers shall be the same as in other similar organizations. In addition, it shall be the duty of the president to deliver an address at the opening of the meeting over which he is to preside.

**"Art. IX.** The dues shall be \$2, paid in advance annually. No applicant shall be considered a member until he has paid his dues and signed the constitution. The initiation fee shall be \$3."

The Committee further stated that the representatives of the Buffalo Microscopical Club, and the Buffalo Society of Natural Sciences, had extended an invitation to the Committee to have the Society meet in Buffalo, and recommended that the second annual session of the association herein proposed—to wit: the American Society of Microscopists—be held in the city of Buffalo, N. Y., August 19th, 1879; and that an attendance of twenty five members of the Society shall constitute a quorum. The Committee further recommended that the Executive Board act for the present year as a Committee on Publication and on Revision of the Constitution

The report of the Committee was adopted, and the Committee discharged. On motion of Mr. Atkinson, the Convention then proceeded to the election of officers of the Society for the ensuing year—with the following results: For President, Dr. R. H. Ward, of Troy, New York; Vice-Presidents, Dr. S. W. Dennis, San Francisco, California, and C. M. Vorce, Cleveland, Ohio; Secretary, Dr. Henry Jameson, Indianapolis, Indiana; Treasurer, H. F. Atwood, Chicago, Illinois. Executive Board, Dr. J. Edwards Smith, Cleveland, Ohio; Dr. Geo. E. Blackham, Dunkirk, New York; and Dr. Wm. H. Atkinson, New York City.

The President-Elect, Dr. Ward, did not wish to accept the office of President of the Society, to which he had just been elected, but the Society refused to accept his resignation.

Mr. Hervey offered the following resolution, which was adopted:

**"Resolved,** That the members of this Microscopical Congress desire to express their very hearty thanks to the local committee for inviting them to this friendly and learned conference; to the citizens generally who have so cordially welcomed us to their homes and entertained us with such generous hospitality, and the public officers for giving use of their building; and proprietors of hotels; to the railroads which have given us facility of transportation, and offered us an elegant excursion about this noble city, and last, but not least, to the enlightened and enterprising press of this city which has done so much to introduce the Congress to public attention and awaken a lively interest in the same, and to spread its proceedings before the large reading public."

The Convention adjourned to meet at 2 o'clock p. m.

## AFTERNOON SESSION.

The Convention re assembled pursuant to adjournment, the President in the chair.

## READING OF PAPERS.

Papers were read as follows: by Mr. W. H. Walmsley on "A New Section Cutter," prepared by Dr. Seiler, of Philadelphia; by Dr. R. H. Ward, on "Biscoe's Section Cutter;" by John W. Sidle, of Philadelphia, on "A New Turn Table;" by Prof. W. H. Seaman, of Washington, on "The Construction of the Huyghenian Eye piece as used in Microscopes;" by Prof. J. E. Smith, on "Micrometer Rulings;" by Prof. A. Litton, on "A New Arrangement for Dark Field Illumination," and on "An Analyzing Eye-Piece;" and by Dr. W. H. Atkinson, on "Epithelium."

The following resolutions were proposed by Professor Hitchcock, and adopted:

"Resolved, That this Congress, representing the various Microscopical Societies and Microscopists of the country, recommend and adopt, for universal use, from this time forth, the 1-100 of a millimetre as our unit of micrometry.

"Resolved, That we request each Society of Microscopists to formally approve our action in this matter, and to request that all authors of papers conform to these resolutions whenever practicable, and that they communicate whatever action they may take to the New York Microscopical Society.

"Resolved, That we request Microscopical Organizations of all countries to formally adopt this same unit, and communicate their action to the same body.

"Resolved, That we recommend the plan of Professor W. A. Rogers for deciding upon a micrometric standard of division to the favorable consideration of the Societies."

The Convention then adjourned to meet in Buffalo, New York, August 19th, 1879.

*Approved:* R. H. WARD, M. D., Pres't.

*Attest:* H. F. ATWOOD, Sec'y.